

# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

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<b>Hatchery Program:</b>	Samish Hatchery Summer / Fall Chinook Fingerling Production
<b>Species or Hatchery Stock:</b>	Nooksack / Samish Summer / Fall Chinook
<b>Agency/Operator:</b>	Washington Department of Fish and Wildlife
<b>Watershed and Region:</b>	Samish River Puget Sound
<b>Date Submitted:</b>	, 2002
<b>Date Last Updated:</b>	August 21, 2002

## **SECTION 1. GENERAL PROGRAM DESCRIPTION**

### **1.1) Name of hatchery or program.**

Samish Hatchery Summer / Fall Chinook Fingerling Program

### **1.2) Species and population (or stock) under propagation, and ESA status.**

Summer / Fall Chinook (*Oncorhynchus tshawytscha*)

### **1.3) Responsible organization and individuals**

<b>Name (and title):</b>	Chuck Johnson, Hatchery Operations Manager
	Ted Thygesen, Nooksack Complex Manager
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**Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program:**

The Lummi Tribe and Glenwood Springs (cooperative facility) all receive fish and/or eggs.

### **1.4) Funding source, staffing level, and annual hatchery program operational costs.**

Funding for this program is provided through the State General Fund.

### **1.5) Location(s) of hatchery and associated facilities.**

Samish Hatchery: Friday Creek (03.0017) RM 1, trib to Samish River  
(03.0005) at RM 10.5, Puget Sound, Washington

Samish R. Rearing Pond: Samish River at RM 10.5

### **1.6) Type of program.**

Isolated Harvest

### **1.7) Purpose (Goal) of program.**

## Augmentation

The goal of this program is to provide summer / fall chinook for harvest opportunity. This hatchery stock is deemed not essential for recovery.

### 1.8) Justification for the program.

This program will be operated to provide fish for harvest while minimizing adverse genetic, demographic or ecological effects on listed fish. This will be accomplished in the following manner:

- 1) Juvenile chinook will be released as smolts to minimize emigration time to saltwater thereby minimizing potential competition with and predation on natural-origin fish.
- 2) Juvenile chinook will be released after the usual wild chinook emigration time to minimize potential adverse interactions.
- 3) All juvenile chinook released will be acclimated at a hatchery facility capable of trapping the majority of returning adults. This practice will minimize straying and make possible the removal or regulation of hatchery fish allowed to spawn naturally.
- 4) All juvenile chinook will be mass marked with an adipose fin clip to distinguish them from wild or naturally spawning chinook.
- 5) Adult chinook produced from this program will be harvested at a rate that allows adequate escapement of listed chinook .

### 1.9) List of program “Performance Standards”.

### 1.10) List of program “Performance Indicators”, designated by "benefits" and "risks."

Performance Standards and Indicators for Puget Sound **Isolated Harvest** Chinook programs.

Performance Standard	Performance Indicator	Monitoring and Evaluation Plan
Produce adult fish for harvest	Survival and contribution rates	Monitor catch and CWT data
Meet hatchery production goals	Number of juvenile fish released - <b>4,000,000</b>	Future Brood Document (FBD) and hatchery records

Manage for adequate escapement where applicable	Hatchery return rates	Monitoring hatchery return rates through trapping and hatchery records
Minimize interactions with listed fish through proper broodstock management and mass marking. Maximize hatchery adult capture effectiveness. Use only hatchery fish	Number of broodstock collected - <b>2,440</b>	Rack counts and CWT data Hatchery records
	Stray rates <b>&lt;4% inside GDU; dependent on acceptable risk profile</b> <b>&lt;1% outside GDU</b>	
	Sex ratios	Spawning guidelines
	Age structure	Hatchery records
	Timing of adult collection/ spawning - <b>late August to late October</b>	
	Adherence to spawning guidelines - <b>multiple pooling of 5 x 5 fish</b>	Spawning guidelines
	Total number of wild adults passed upstream - <b>all excess adults (# of wild, unknown)</b>	
Minimize interactions with listed fish through proper rearing and release strategies	Juveniles released as smolts	FBD and hatchery records
	Out-migration timing of listed fish / hatchery fish <b>early May/ end of May/June</b>	FBD and historic natural outmigration times
	Size and time of release <b>80 fpp/June release</b>	FBD and hatchery records
Maintain stock integrity and genetic diversity	Effective population size	Spawning guidelines
	Hatchery-Origin Recruit spawners	

<p>Maximize in-hatchery survival of broodstock and their progeny; and</p> <p>Limit the impact of pathogens associated with hatchery stocks, on listed fish</p>	<p>Fish pathologists will monitor the health of hatchery stocks on a monthly basis and recommend preventative actions / strategies to maintain fish health</p>	Co-Managers Disease Policy
	<p>Fish pathologists will diagnose fish health problems and minimize their impact</p>	Fish Health Monitoring Records
	<p>Vaccines will be administered when appropriate to protect fish health</p>	
	<p>A fish health database will be maintained to identify trends in fish health and disease and implement fish health management plans based on findings</p>	
	<p>Fish health staff will present workshops on fish health issues to provide continuing education to hatchery staff.</p>	
<p>Ensure hatchery operations comply with state and federal water quality standards through proper environmental monitoring</p>	<p>NPDES compliance</p>	<p>Monthly NPDES records</p>

### 1.11) Expected size of program.

#### 1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

Fall chinook broodstock is collected at Samish Hatchery for programs at Samish, the Lummi Tribe and for the yearling program at Glenwood Springs. The total egg take is approximately 5,500,000. Assuming a M:F sex ratio of 1:1, a fecundity of 4,600 and a prespawning mortality of 2 %, 2,440 adults are needed. Should any of these variables

change, broodstock collection numbers would change accordingly.

**1.11.2) Proposed annual fish release levels (maximum number) by life stage and location. .**

Life Stage	Release Location	Annual Release Level
Eyed Eggs		
Unfed Fry		
Fry		
Fingerling	Samish River (03.0005)	4,000,000*
Yearling		

\* - Scaled back for 2002 from 5.2 million release.

\*\* - Additional 1 million transferred to the Lummi tribe.

\*\*\* - If Glenwood Springs fell short of its' egg take needs, the Samish Hatchery would provide the shortfall.

**1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.**

The average smolt-to-adult survival rate for 88 BY through 94 BY's is .48%. Escapement levels back to the hatchery rack for broodyears 1995 through 2001 were 7,474, 9,958, 16,961, 8,950, 7,172, 4,604 and 15,141, respectively.

**1.13) Date program started (years in operation), or is expected to start.**

Fall chinook eggs were transferred in by the Feds in 1914 (WDFG, 1916) from the Columbia River. Columbia River-origin eggs were supplanted by Green River-origin eggs in 1929. No chinook eggs were taken from broodstock returning to the Samish Hatchery prior to 1937, after which time, the chinook return was built to a sufficient level to provide egg takes to began releasing fall chinook fingerlings in 1938 (WDF 1939;1941).

**1.14) Expected duration of program.**

Program is expected to continue indefinitely. In addition to current program, 1 million fingerlings are moved to the Lummi Sea Pens for rearing and release.

**1.15) Watersheds targeted by program.**

Samish River (03.0005)

**1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.**

## **SECTION 2. PROGRAM EFFECTS ON ESA-LISTED SALMONID POPULATIONS.**

### **2.1) List all ESA permits or authorizations in hand for the hatchery program.**

None

### **2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.**

#### **2.2.1) Description of ESA-listed salmonid population(s) affected by the program.**

**- Identify the ESA-listed population(s) that will be directly affected by the program.**

None

**- Identify the ESA-listed population(s) that may be incidentally affected by the program.**

NF Nooksack Spring Chinook  
Lower Skagit mainstem / tributaries Fall Chinook

#### **2.2.2) Status of ESA-listed salmonid population(s) affected by the program.**

**- Describe the status of the listed natural population(s) relative to “critical” and “viable” population thresholds**

Critical and viable population thresholds under ESA have not been determined, however, the SASSI report determined the Nooksack spring chinook population to be "critical" and Lower Skagit mainstem / tributary fall chinook to be "depressed".

**- Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.**

**- Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information. Indicate the source of these data.**

In the period 1989-99, the average number of natural spawning chinook (non-marked) in the Samish basin, above and below the rack at RM 10, has been 1935 fish. (WDFW annual escapement estimates.) Since the freshwater life history of this stock is a fingerling outmigrant (0+), juvenile habitat capacity is not relative.

**- Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of**

**direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.**

Has not been quantified. However, cursory examination of the marked-to-unmarked carcass ratio on the spawning grounds compared to the marked-to-unmarked ratio in the hatchery return shows about equal numbers of natural-origin spawners to hatchery-origin spawners. Fall chinook have been mass marked with an adipose-fin clip. Approximately 50% of the 1999 brood was unmarked due to a disease outbreak caused from crowding the fish for mass marking. Plans are underway to divide this pond into four sections to facilitate mass marking and reduce crowding to avoid potential disease outbreaks. This pond modification is scheduled to be completed to accommodate the 2000 brood. With modification complete, the 2001 release (2000 brood) consisted of 4.8 million adipose-fin clip only, 200,000 adipose-fin clip/coded-wire tagged (Ad+CWT) and 200,000 fish coded-wire tagged only. For the 2001 brood, 3.6 million were mass marked (adipose-fin clip only), 200,000 Ad + CWT'd and 200,000 fish CWT'd only.

**2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take**

**- Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.**

There is an unknown level of risk for take of listed fish during broodstock collection until mass marked adults return to the hatchery. All returning chinook are trapped for spawning. Surplus adults are passed upstream to spawn naturally. With mass marking beginning with the 2000 brood, all natural-origin adult returns, starting in 2004, will be identifiable.

Samish intake is not in compliance with NMFS screening criteria. Intake screens at Samish Hatchery have been identified in the WDFW Capital Budget process and will be replaced, pending funding, to conform with NMFS screening guidelines to minimize the risk of entrainment of juvenile natural-origin fish.

The Samish gravity intake fish ladder may cause a short passage delay during extremely low or high flows. For chinook the delay risk for chinook is low.

See "take" table at the end of this HGMP.

**- Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.**

Not known.



**Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).**

See "take" table at the end of this HGMP.

**- Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.**

With mass marking beginning with the 2000 brood, all natural-origin adult returns, starting in 2004, will be identifiable.

### **SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES**

**3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the NPPC *Annual Production Review Report and Recommendations* - NPPC document 99-15). Explain any proposed deviations from the plan or policies.**

None

**3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.**

This hatchery program will be operated consistent with the Puget Sound Management Plan.

**3.3) Relationship to harvest objectives.**

**3.3.1) Describe fisheries benefitting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available.**

Fisheries benefitting from the program are the Washington sport and commercial as well as the Canadian sport and commercial fisheries. Percent contribution of the total catch of Samish fingerling fall chinook to Washington fisheries averaged ~ 46%, while the contribution to the Canadian catch averaged ~ 26%. Of the Washington portion, the average catch in the sport fishery was 29.9%, while the commercial averaged 70.1% of the total catch. (1988-94 coded-wire tag data)

**3.4) Relationship to habitat protection and recovery strategies.**

**3.5) Ecological interactions.**

1) Negatively impact program: There may be residual hatchery steelhead and wild cutthroat (Fuss et. al. 1999b), which could potentially prey on chinook fingerlings. Great blue herons, gulls, belted kingfisher, common merganser and cormorant are present during migration and may prey on both hatchery and wild chinook.

2) Negatively impacted by program: Less than 2% of the hatchery chinook will delay their migration for up to six weeks, but this can amount to several tens of thousands of hatchery fish which could compete for food with natural fish (Fuss et.al. 1999a). Large scale releases of coho, steelhead or chinook may attract avian predators which may linger during the period of listed chinook rearing and migration. Non-indigenous stray adults may successfully breed with listed chinook or naturalized chinook. Using CWT data, no Samish fall chinook have been found on the Nooksack River spawning grounds.

3) Positively impact program: A percentage of the natural production, including listed chinook, may be sustained by hatchery fish successfully spawning in the river below the hatchery. Carcasses allowed to decompose in the stream help replenish beneficial nutrients to the system. This increase in nutrients may cause an increase in the food supply within the stream thus contributing to increased growth and consequently increased survival of naturally produced chinook, coho, chum, pink, steelhead and cutthroat (Michael 1995).

4) Positively impacted by program: Mass releases of hatchery chinook may overwhelm established predator populations providing a beneficial effect to the wild fish due to reduced predation.

## **SECTION 4. WATER SOURCE**

**4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.**

Samish Hatchery uses well water and Friday Creek water for incubation of fall chinook. Friday Creek and the Samish River water are utilized for rearing. Samish Hatchery NPDES permit number is WAG-133011. Samish intake is not in compliance with NMFS screening criteria.

**4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.**

Intake screens at Samish Hatchery will be replaced to conform with NMFS screening guidelines to minimize the risk of entrainment of juvenile natural-origin fish.

## **SECTION 5. FACILITIES**

**5.1) Broodstock collection facilities (or methods).**

At Samish Hatchery, adults are held in the adult holding pond on the Samish River. The pond size is 300' X 30' X 4'. Fish enter the pond by ladder.

**5.2) Fish transportation equipment (description of pen, tank truck, or container used).**

Broodstock are not transported.

**5.3) Broodstock holding and spawning facilities.**

Same as 5.1.

**5.4) Incubation facilities.**

Incubation is in the hatchery at Samish in vertical Heath Techna incubators. Well water is used for eyeing eggs. Surface water for fry.

**5.5) Rearing facilities.**

Samish Hatchery has 8 - 20' x 80' x 3' concrete rearing ponds, 4 - 20' X 100' x 4' concrete rearing ponds, one ¼ acre rearing asphalt pond and one ⅓ acre rearing asphalt pond.

**5.6) Acclimation/release facilities.**

Fish are acclimated on Samish River / Friday Creek water until released from Samish River adult pond.

**5.7) Describe operational difficulties or disasters that led to significant fish mortality.**

None

**5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.**

The hatchery is staffed full-time and equipped with a low-water alarm system to help prevent catastrophic fish loss resulting from water system failure.

**SECTION 6. BROODSTOCK ORIGIN AND IDENTITY**

**Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.**

**6.1) Source.**

Broodstock source is adult fall chinook returning to Samish Hatchery.

## **6.2) Supporting information.**

### **6.2.1) History.**

Green River-origin chinook eggs were first transferred to the Samish Hatchery in 1929, supplanting Columbia River-origin eggs (Kalama River and Wind River) as a source of fall chinook production for the facility (WDFG, 1932), which were first transferred in by the Feds in 1914 (WDFG, 1916). A consistent year-to-year chinook salmon egg transfer program from Green River to Samish began in 1938, in an attempt to "create a return to the Samish River that could be self-sustaining" (WDF, 1938). No chinook eggs were taken from broodstock returning to Samish prior to 1937, after which time, the chinook return was built to a sufficient level to provide egg takes (WDF, 1939; 1941). GSI analysis identifies this stock as typical of Puget Sound fall chinook (especially Soos Creek origin) and different than lower Columbia tule stocks. This stock has been propagated with no new introductions for the last four generations without significant input of genetic material from other sources, including Soos Creek.

### **6.2.2) Annual size.**

Current annual broodstock collection level is 2,440 adults.

### **6.2.3) Past and proposed level of natural fish in broodstock.**

The fish from the 2000 and 2001 broodyear releases were 100% marked to allow monitoring and evaluation of the hatchery program releases and returns (beginning in 2004). This will provide a mechanism to incorporate any natural-origin fish into the broodstock if deemed necessary.

### **6.2.4) Genetic or ecological differences.**

No differences are known.

### **6.2.5) Reasons for choosing.**

Locally adapted stock.

## **6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.**

The collection of localized hatchery-origin broodstock at this location will limit direct and incidental take effects on listed chinook salmon.

## **SECTION 7. BROODSTOCK COLLECTION**

**7.1) Life-history stage to be collected (adults, eggs, or juveniles).**

Adults

**7.2) Collection or sampling design.**

Adult chinook are collected from late August to late October using a weir trap at the Samish Hatchery holding pond.

**7.3) Identity.**

Currently, there is no way to differentiate hatchery from wild chinook at these facilities until the return of mass marked fish (See section 6.2.3).

**7.4) Proposed number to be collected:**

**7.4.1) Program goal (assuming 1:1 sex ratio for adults):**

2,440 adults

**7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available:**

Year	Adults			Eggs	Juveniles
	Females	Males	Jacks		
1988	1,984	2,444	4,391	8,797,000	
1989	4,080	12,315	273	17,460,700	
1990	3,317	12,152	232	16,353,000	
1991	4,040	4,668	594	18,440,700	
1992	2,778	4,632	1,123	13,340,400	
1993	3,538	7,761	427	15,815,000	
1994	3,154	3,347	359	14,284,000	
1995	2,995	2,038		13,003,000	
1996	2,713	2,053		10,646,900	
1997	2,723	2,377		11,208,800	
1998	1,932	1,591		9,133,200	
1999	1,732	1,785		7,337,800	
2000	1,428	1,482	15	6,119,200	

2001	1,687	1,685	2	7,107,900	
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**7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.**

Currently, adults (ratio of 1:1) not needed for broodstock are allowed upstream of Samish Hatchery to spawn naturally and enhance the nutrient load in the upper watershed. All fish returning to the facility will be sampled for coded-wire tags.

**7.6) Fish transportation and holding methods.**

No transportation of adults takes place. They are held in the collection/holding pond until spawned.

**7.7) Describe fish health maintenance and sanitation procedures applied.**

Consistent with Co-Managers Salmonid Disease Control Policy

**7.8) Disposition of carcasses.**

All spawned fish are sold to buyer. Unspawned carcasses are sold or donated.

**7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.**

Starting in 2004, only marked adults will be used for broodstock unless not deemed appropriate by WDFW Fish Program/NMFS.

## **SECTION 8. MATING**

**Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.**

**8.1) Selection method.**

Fish are randomly chosen from ripe fish on spawning days.

**8.2) Males.**

Males are pooled into groups of 5.

### **8.3) Fertilization.**

Females are pooled into groups of 5 and spawned with 5 pooled males. Fertilization takes place at the incubation site.

### **8.4) Cryopreserved gametes.**

No cryopreservation.

### **8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.**

Starting in 2004, all marked adults will be used for broodstock unless not deemed appropriate by WDFW Fish Program/NMFS.

## **SECTION 9. INCUBATION AND REARING -**

**Specify any management *goals* (e.g. “egg to smolt survival”) that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.**

### **9.1) Incubation:**

#### **9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.**

Samish Hatchery: 1984 to 1988  
Green egg to fry avg: 88.5% to 97.9%  
Fry to smolt avg: 72.5% to 98.4%

#### **9.1.2) Cause for, and disposition of surplus egg takes.**

Extra 10% eggs are taken to ensure program. With normal loss this puts the production at or below program.

#### **9.1.3) Loading densities applied during incubation.**

Vertical Heath Techna incubators are used at Samish Hatchery. Flow is 4 gpm for each stack of 16. Maximum loading is 8,000 eggs per tray. Well water is used for eyeing eggs. Friday Creek water is used to supplement the well water for hatching and fry incubation because of increased demand for water.

#### **9.1.4) Incubation conditions.**

Friday Creek water is combined with well water. Dissolved oxygen is monitored but never a factor as the parts per million (ppm) is always above minimum. Silt is removed by flushing the trays.

#### **9.1.5) Ponding.**

Fish are ponded (forced) at 1800 Temperature Units (TU's). Yolk is >95% absorbed.

#### **9.1.6) Fish health maintenance and monitoring.**

Flush treatment is used to control fungus at Samish Hatchery. Egg mortality is removed before hatching. Vexar substrate is used to improve fry development.

#### **9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.**

Samish fall chinook eggs are incubated on well water to minimize the risk of catastrophic loss due to siltation. With the introduction of creek water for fry incubation, trays are flushed to minimize the risk of catastrophic loss due to siltation.

### **9.2) Rearing:**

#### **9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available..**

Kendall Creek: 1984 to 1988

Green egg to fry range: 74.6% to 97.5%

Fry to smolt range: 93% to 97.1%

Samish Hatchery: 1984 to 1988

Green egg to fry range: 88.5% to 97.9%

Fry to smolt range: 72.5% to 98.4%

#### **9.2.2) Density and loading criteria (goals and actual levels).**



Fish are kept below the maximum flow index level for a given temperature. Density index is kept below .3.

#### **9.2.3) Fish rearing conditions**

Friday Creek water is used. Fish rearing is dependent on ambient temperatures and conditions. Dissolved oxygen is monitored. Ponds are cleaned weekly. Fish will be transferred to the Samish River pond for acclimation and release.

#### **9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.**

NA

#### **9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.**

NA

#### **9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).**

Fish are started on Bio-Oregon Biodiet then fed Biomoist feeds. Feeding rate is 2 to 3%B.W./day and the lbs/gpm is kept below .15 lbs/day/gpm.

#### **9.2.7) Fish health monitoring, disease treatment, and sanitation procedures.**

Consistent with Co-Managers Salmonid Disease Control Policy

#### **9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.**

Not applicable.

#### **9.2.9) Indicate the use of "natural" rearing methods as applied in the program.**

None at this time.

#### **9.2.10) Indicate risk aversion measures that will be applied to minimize the**

**likelihood for adverse genetic and ecological effects to listed fish under propagation.**

Fish are reared to sub-yearling smolt size (zeros) to mimic the natural fish emigration strategy. Fish under propagation will be from marked (non-listed) adults beginning in 2004. Pond modifications will improve disease control and help facilitate mass marking 100% ( began with 2000 broodyear) of the production.

**SECTION 10. RELEASE**

**Describe fish release levels, and release practices applied through the hatchery program.**

**10.1) Proposed fish release levels.**

Age Class	Maximum Number	Size (fpp)	Release Date	Location
Eggs				
Unfed Fry				
Fry				
Fingerling	4,000,000*	80	May/June	Samish R.
Yearling				

\* reduced from 5,200,000 with 2001 brood

**10.2) Specific location(s) of proposed release(s).**

**Stream, river, or watercourse:**

**Release point:**

Samish Holding Pond: Samish River (03.0005) at RM 10.5

**Major watershed:** Samish River

**Basin or Region:** Puget Sound

**10.3) Actual numbers and sizes of fish released by age class through the program.**

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1988					5,800,000	131 fpp		
1989					5,514,000	113 fpp		
1990					5,486,000	78 fpp		
1991					4,864,000	73 fpp		
1992					5,431,000	69 fpp		

Release year	Eggs/ Unfed Fry	Avg size	Fry	Avg size	Fingerling	Avg size	Yearling	Avg size
1993					5,206,000	78 fpp		
1994			5,379,600	255 fpp	2,303,000	77 fpp		
1995					5,311,000 <b>1,240,480</b>	80 fpp <b>107-740</b>		
1996					5,020,000 <b>898,467</b>	68 fpp <b>66-472</b>		
1997					5,200,000 <b>862,160</b>	95 fpp <b>150-425</b>		
1998					5,274,000 <b>1,695,184</b>	95 fpp <b>80-135</b>		
1999					4,660,000 <b>998,000</b>	70 fpp <b>67-75</b>		
2000					4,700,495	88 fpp		
2001					3,742,277	83 fpp		
Average					4,893,698	86 fpp		

**Note:** Release numbers in "**Bold**" are for Whatcom Creek Chinook. (**Program closed**) All other numbers are for Samish hatchery only.

#### 10.4) Actual dates of release and description of release protocols.

Fish are released the end of May to early June. Release is forced.

#### 10.5) Fish transportation procedures, if applicable.

Fish are trucked from the hatchery on Friday Creek to the release (adult holding) pond on the Samish River.

#### 10.6) Acclimation procedures

Fish are reared on Friday Creek water and transferred to the Samish River holding pond for acclimation and release.

#### 10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Fall chinook have been mass marked with an adipose-fin clip. Approximately 50% of the 1999 brood was unmarked due to a disease outbreak caused from crowding the fish for mass marking. Construction has been completed to divide the primary rearing pond into four sections to facilitate mass marking and reduce crowding to avoid potential disease outbreaks. With modification complete, the 2001 release (2000 brood) consisted of 4.8 million adipose-fin clip only and a Double-Index Tag (DIT) group of 200,000 adipose-fin clip/coded-wire tagged (Ad+CWT) and 200,000 fish coded-wire tagged only. For the 2001 brood, 3.6 million were mass marked (adipose-fin clip only), 200,000 Ad + CWT'd and 200,000 fish CWT'd only. WDFW shall continue this tagging scenario and/or an additional otolith mark to allow for evaluation of the fishery contribution, survival rates and of the straying levels to other Puget Sound watersheds. Strays have been found in the lower Skagit MS GDU at levels that have been identified as low risk by the Risk Assessment (WDFW). No strays have been found in the Nooksack River.

**10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.**

This situation should not arise as surplus to program goals can be dealt with at various times before release.( i.e as eggs, at pond inventory, etc). Should it arise for some unforeseen reason, regional staff will be consulted as to releasing the surplus into a local lake or other options. NMFS will be informed and/or consulted in the matter.

**10.9) Fish health certification procedures applied pre-release.**

Fish are checked by a Fish Health Specialist prior to release.

**10.10) Emergency release procedures in response to flooding or water system failure.**

In case of water system failure portable pumps will be used to supply water from the creek. With that failing, fish would be released into creek.

**10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.**

All fall chinook fingerlings are released when smolting to insure proper migration to the estuary. Fish are similar in size to wild smolts. Predation on listed fish is considered "low"and competition is considered "unknown" (WDFW Risk Assessment 2000). Limiting juvenile production and releases to current (proposed) levels will help retain, and not forestall, potential future options for the recovery of the listed chinook ESU. Also, reducing the fingerling program from 5.2 to 4.0 million will help reduce any possible straying to other watersheds.

## **SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS**

### **11.1) Monitoring and evaluation of “Performance Indicators” presented in Section 1.10.**

Note: See section 1.10 for Monitoring and Evaluation. The purpose of a monitoring program is to identify and evaluate the benefits and risks which may derive from the hatchery program. The monitoring program is designed to answer questions of whether the hatchery is providing the benefits intended, while also minimizing or eliminating the risks inherent in the program. A key tool in any monitoring program is having a mechanism to identify each hatchery production group.

Each production group shall be identified with distinct otolith marks, adipose clips, coded wire tags, blank wire tags or other identification methods as they become available, to allow for evaluation of each particular rearing and/or release strategy. This will allow for selective harvest on hatchery stocks when appropriate, monitoring of interactions of hatchery and wild fish wherever they co-mingle in riverine, estuarine and marine habitats and assessment of the status of the target population. WDFW shall monitor the Chinook salmon escapement into the target and non-target Chinook populations to estimate the number of tagged, un-tagged and marked fish escaping into the river each year and the stray rates of hatchery Chinook into the rivers.

#### **11.1.1) Describe plans and methods proposed to collect data necessary to respond to each “Performance Indicator” identified for the program.**

Refer to section 1.10.

WDFW shall apply an identifiable mark to 100% of the fall chinook salmon fingerlings released through the hatchery program each year to allow monitoring and evaluation of the program's releases and adult returns. WDFW also shall apply coded-wire tags or a otolith mark to a portion of the production at Samish Hatchery to allow for evaluation of fishery contribution, survival rates and straying levels to other Puget Sound watersheds.

#### **11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.**

Staffing hours to conduct spawning ground surveys and biological assessment is limited by funding. 100 % of the release at Samish are a combination mass marked (adipose-fin clip only, 3.6 million) and double-index tagged (200,000 Ad+CWT and 200,000 CWT only). As indicated above, this tagging will allow for monitoring and evaluating the program as far as fisheries contribution, total survival, migration patterns, straying into other watersheds and onto the Samish River spawning grounds.

Funding and resources are currently committed to monitor and evaluate this program as detailed in the Resource Management Plan for Puget Sound Chinook Salmon Hatcheries (Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, August 23, 2002).

**11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.**

Monitoring and evaluation will be undertaken in a manner which does not result in an unauthorized take of listed chinook.

## **SECTION 12. RESEARCH**

There is currently no research being conducted on Samish fingerling fall chinook

**12.1) Objective or purpose.**

**12.2) Cooperating and funding agencies.**

**12.3) Principle investigator or project supervisor and staff.**

**12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.**

**12.5) Techniques: include capture methods, drugs, samples collected, tags applied.**

**12.6) Dates or time period in which research activity occurs.**

**12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.**

**12.8) Expected type and effects of take and potential for injury or mortality.**

**12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached “take table” (Table 1).**

**12.10) Alternative methods to achieve project objectives.**

**12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.**

**12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.**

## **SECTION 13. ATTACHMENTS AND CITATIONS**

Washington Department Fish and Game (WDFG). 1932. Annual Report for 1930-31. Washington Fish and Game. Seattle, WA.

Washington Department Fish and Game (WDFG). 1916. Annual Report for 1914-15. Washington Fish and Game. Seattle, WA.

Washington Department of Fisheries (WDF). 1938. Annual Report for 1937. Washington Department of Fisheries. Seattle, WA.

Washington Department of Fisheries (WDF). 1939. Annual Report for 1938. Washington Department of Fisheries. Seattle, Wa.

Washington Department of Fisheries (WDF). 1941. Annual Report for 1940. Washington Department of Fisheries. Seattle, Wa.

Washington Department of Fish and Wildlife and Puget Sound Treaty Tribes, 2002, “Puget Sound Chinook Salmon Hatcheries, Resource Management Plan”, a component of Comprehensive Chinook Salmon Management Plan, August 23, 2002. 103 pages.

**SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY**

“I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973.”

Name, Title, and Signature of Applicant:

Certified by \_\_\_\_\_ Date: \_\_\_\_\_



Table 1. Estimated listed salmonid take levels of by hatchery activity.

<b>Listed species affected: Chinook Salmon ESU/Population: Puget Sound Activity: Fingerling Chinook Program</b>				
<b>Location of hatchery activity: Samish R./ Friday Creek Dates of activity: August-May/June Hatchery program operator: WDFW</b>				
<b>Type of Take</b>	<b>Annual Take of Listed Fish By Life Stage (<i>Number of Fish</i>)</b>			
	Egg/Fry	Juvenile/Smolt	Adult	Carcass
<b>Observe or harass a)</b>				
<b>Collect for transport b)</b>				
<b>Capture, handle, and release c)</b>			Unknown	
<b>Capture, handle, tag/mark/tissue sample, and release d)</b>				
<b>Removal (e.g. broodstock) e)</b>			Unknown	
<b>Intentional lethal take f)</b>				
<b>Unintentional lethal take g)</b>	Unknown	Unknown	Unknown	
<b>Other Take (specify) h)</b>				

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.

b. Take associated with weir or trapping operations where listed fish are captured and transported for release.

c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.

d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.

e. Listed fish removed from the wild and collected for use as broodstock.

f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.

g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.

h. Other takes not identified above as a category.